# Boone County, Missouri Shared GIS Consortium October 28-29, 2009 GIS Visioning Workshop Report

"Provide a comprehensive and integrated GIS that provides all users access to data and applications that can be used to benefit the decision-making process of all users."







# Introduction

The Boone County, Missouri Shared GIS Consortium conducted a Geographic Information System (GIS) Visioning Workshop at the City of Columbia Police Training Center in Boone County, Missouri, on October 28 and 29, 2009. The GIS Coordinators for the City and County, John Fleck (City) and Jason Warzinik, *GISP* (County), organized the workshop to obtain input from department directors, elected officials and community leaders on the future direction of the Boone County Shared GIS Consortium. Building on the success of the existing GIS program, and recognizing the fact that the benefits of GIS extend far beyond one department, the Consortium sponsored the workshop in hopes that the community could better utilize and extend existing GIS capabilities. When used as a core enterprise technology, GIS can have a profound impact on local government operations. One of the objectives for the GIS Visioning Workshop was to develop a consensus between Consortium members on the future application of GIS technology within the community. To help the group achieve their objective, Stephen Kinzy, *GISP* and Kim Burns from ESRI facilitated the visioning workshop using short overview presentations and a series of consensus-building Nominal Group Techniques (NGT). The following individuals participated in the workshop as representatives of their respective organizations:

#### <u>Name</u>

#### **Agency**

1.	Jason Warzinik	Boone County	GIS Manager
2.	Tom Schauwecker	Boone County	Assessor
3.	Stan Shawver	Boone County	Planning and Building Director
4.	Pat Lensmeyer	Boone County	Collector
5.	Chip Estabrooks	Boone County	Public Works Maint. and Oper. Division Manager
6.	Derin Campbell	Boone County	Interim Public Works Director
7.	Gary German	Boone County	Sheriff's Department Captain
8.	Chad Martin	Boone County	Sheriff's Department Captain
9.	Karen Miller	Boone County	Commissioner
10	. Ryan Euliss	Boone Electric Cooperative	Manager of Engineering and Technical Services
11.	Tim Nietzel	Boone Electric Cooperative	GIS Supervisor
12	. Tony St. Romaine	City of Columbia	Assistant City Manager
13	Stuart King	City of Columbia	Public Works
14.	Tim Teddy	City of Columbia	Director of Planning and Community Dev.
15.	Dan Schneiderjohn	City of Columbia	Public Health and Human Services
16	Ann Peters	City of Columbia	Planning and Zoning
17.	Pat Fowler	University of Missouri	Office of Service - Learning
18	Zim Schwartze	City of Columbia	Public Safety Joint Communication Director
19	David Storovick	City of Columbia	Interim Engineering Manager - Water and Light
20.	Robert Simms	City of Columbia	Director - Information Technologies
21	Mike Hood	City of Columbia	Director of Parks and Recreation
22.	Steve Monticelli	City of Columbia	Police Captain

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23. Jerry Wade	City of Columbia	4 <sup>th</sup> Ward City Council
24. Barbara Hoppe	City of Columbia	6 <sup>th</sup> Ward City Council
25. Karl Skala	City of Columbia	3 <sup>th</sup> Ward City Council
26. Scott Olsen	Boone Fire Protection District	Fire Chief
27. Chris Kelley	City of Columbia	Police Sergeant



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Boone County

#### **GIS Visioning Workshop Agenda** October 28-29, 2009



**Day One** Welcome & Introductions

> Jason Warzinik, GISP opened the workshop by introducing everyone to the Boone County, Missouri Shared GIS Consortium. He provided some history on the creation of the Consortium, beginning with a consultant's study in 1993 that led to the creation of the Consortium's Policy and Technical Committees and eventually to the 1997 Cooperative Agreement between Boone Electric Cooperative, the City of Columbia, and Boone County. As a result of the Cooperative Agreement the Consortium has responsibility for the development of the existing GIS Database, Base Map and Core Systems. They have also provided high-speed fiber optics connections between the participants.

Following the introduction of the Consortium Jason welcomed the key-note speaker for the Workshop – Steven Marsh, President of the Missouri Geographic Information Systems Advisory Committee and the Jackson County, Missouri GIS Director. Steven did an excellent job answering the question: -- When is a GIS truly successful?"

- When it is used to modify an existing business process to:
  - Save money
  - Save time
  - Improve the end result of the process 0

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• Make the Result of the Process Easier to Repeat and Connect with other Processes

Using examples from Jackson County, Missouri including multi-jurisdictional address and tax code maintenance, the coordinated purchase of imagery for the county, and e-Government/economic development applications Steven described the Path to a Successful GIS as requiring:

- Acceptance
- o Buy-in
- Participation
- Integration



**Steven Marsh**, Jackson County, Missouri GIS Director After the opening remarks participants introduced themselves and were asked to indicate what they would like to accomplish through the workshop. This information was recorded (see below) to be used as a guide to help meet the group's expectations.



#### **Workshop Expectations**

- Learn how others use GIS and how we can help facilitate this usage
- See what data others have so I can -steal" it
- See what data the Boone County Sheriff's Department can provide to others
- Witness expansion of consortium and include utilities/water
- See what others are doing and how I can participate as a technical person
- Use <u>train tracks</u>" to connect the various departments and users
- How to —tur on" constituents and find out where they want to go
- Ways to improve quality of information for public understanding of issues involved





- Focus where we are going and how to get the best bang for the buck
- Ways to expand GIS into other areas of Boone County Electric
- Information sharing with stakeholders
- Non-technical ideas about GIS
- Better understanding of GIS and visualization of potential
- How to find data
- What other departments' GIS usage is, and potential partnerships
- How to take GIS to next level
- What community leaders want out of GIS
- Spirit of cooperation
- What people plan on using technology for
- How to use GIS as a planning tool
- Learn what GIS is and how to use it
- Data layers for community issues management
- How this all connects
- How Police Department can use technology
- Best practices to present information to the public
- Education
- New ideas on how to improve services
- How to use our data for better services

# Presentation—GIS Overview: Performance-Based GIS

An overview presentation was conducted to give everyone a common understanding of GIS and its power to impact the organization. This presentation focused on GIS strategies designed to ensure the development of a successful program with emphasis on high value return-on-investment GIS applications. A number of successful case studies were described, and a video presentation from Gov. Martin O'Malley, Governor of Maryland and former Mayor of Baltimore, describing the importance of GIS for public administration, was shown.

A group exercise was conducted around the following nominal group question to identify and rank a list of primary GIS requirements for the workshop participants.



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# **Nominal Group Questions**

## What are the three most important GIS applications for <u>your</u> department?

**Ranking of responses:** (the total weighted points are in bold and the numbers of first place votes are in parentheses)



- 1. Improve addressing visually and consistently so everyone is on the same page—22 (6)
- 2. 100% accurately represent facilities—15 (5)
- 3. Access to data for decision-making any place, anytime—13 (1)
- 4. Address hierarchy across multiple jurisdictional levels—9 (3)
- 5. Data recovery/redundancy—9 (0)
- 6. Full needs analysis from all customers and prioritize these needs—7 (1)
- Set of base maps containing basic units of expression—6 (2)
- 8. GIS-based social services—6 (1)
- 9. Executive dashboard—6(0)
- 10. Map and analyze business processes—6(0)
- 11. Connectivity to make data intelligent and sharable (standards)—5 (1)
- 12. Where are assets and what shape are they in—5(1)
- 13. Multi-Use system based on needs analysis—5(0)
- 14. Ability to pull information from various resources—4 (0)
- 15. Emergency management—4 (0)
- 16. Cost benefit to stakeholders—3 (1)
- 17. CRM—2 (0)
- 18. Integration of plans—2(0)
- 19. Novice end user ease of use—2(0)
- 20. Predict results with minimal data input-2 (0)
- 21. Identify terrain, vegetative cover, riparian (natural resources) features—1 (0)

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- 22. Easy access to all information on community resources—1 (0)
- 23. Constituent buy-in and incentives—1 (0)
- 24. Seamless linkage to land records—1 (0)
- 25. Growth and user training—1(0)
- 26. Elevations/geography available—0
- 27. Visual land use planning tool for storm water management—0
- 28. Crime maps/hot spot maps (animated)-0
- 29. Parcel polygon as basic common denominator—0
- 30. Assist public safety entities/all entities on what will assist them—0
- 31. Where does bad and good stuff happen, and what resources are allocated to these—0
- 32. Historical administrative boundaries—0
- 33. ROW/easements-0
- 34. How is natural resource inventory used—0
- 35. Increased mobility—0
- 36. Ability to cross-tabulate and suitability modeling—0
- 37. Get/create the information as quickly as possible—0
- 38. Data sharing via services in real time—0
- 39. Open/transparent access to public information—0
- 40. Flow of information from field to office precisely and timely—0
- 41. Understandability—0
- 42. Pavement management—0
- 43. Address hierarchy—0
- 44. Revenue recovery—0
- 45. Emergency management portability—0
- 46. Web mapping for community feedback—0
- 47. Ability to integrate multiple web services into one real time interface—0
- 48. Tracking/information access & services to measure accountability—0





#### Lunch

# The Boone County Shared GIS Consortium Application and Database Presentations

Zim Schwartze & Brian Maydwell, *Boone County / Columbia Joint Communications Center*, gave an excellent presentation about E911 Communications Center GIS.

#### **Public Safety Joint Communications**

GIS is used in:

- Day-to-day operations to locate incoming 911 calls and CAD (Computer Aided Dispatch) incidents.
- Assisting User Agencies in defining their response areas among each other and within CAD.
- Providing some analysis functions to our User Agencies as needed.
- Merging the existing CAD database with GIS database data making it more -map friendly."



#### **Office of Emergency Management**

GIS is used:

- To detail areas affected during times of disaster.
- To create static maps for the City/County Emergency Operations Plan.
- As a communication tool for a common operating picture among responders as well as the citizens.
- To find areas that might need to be addressed with mitigation efforts before and after a disaster.



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**Tony St. Romaine**, *Assistant City Manager, City of Columbia* [Tony filled in for John Fleck, the City's GIS Coordinator, who was sick during the Workshop] – Tony described the City's Natural Resource Inventory for the Columbia Metro Area.

#### **NRI Project Overview**

- The City Council directed staff to initiate and develop a Natural Resources Inventory (NRI) for the Columbia Metro Area.
- The NRI is a compilation of GIS data, descriptions, and maps to document the natural resources in the City of Columbia and Columbia Metro area.
- The NRI project was funded by contributions from the Department of Planning & Development, the Water & Light Department, and the General Fund.
- The data to be developed, collected and compiled was identified by data stakeholders from City departments and for stakeholders within the community.

# Key Outcomes of the NRI

- Documentation of the geographical location of resources
- Display and provide summaries of existing data
- Assessment of natural resource functions and condition
- Analysis of the inter-relationships between natural resources
- Identification of the threats to the existing health and integrity
- Provision of benchmarks against which future change can be measured
- Identification of additional areas for further study
- Incorporation of new or revised information identified by interested citizens





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**Ryan Euliss,** *Boone Electric Cooperative* – Ryan presented the history of the Cooperative's GIS capabilities development and how it has transformed their organization.

#### **Before GIS:**

- The drafting process was very time consuming and usually took weeks to complete.
- Once the updates were completed, the <u>-linens</u>" and <u>-mylars</u>" were sent to an engineering firm in Joplin, Missouri.
- The mylars and linens would be copied and reduced to 11" x 11" double-sided pages, then replicated to match the number of map books needed (usually around 50).
- The reduced map pages, mylars and linens were returned to us approximately 4 weeks later.

#### -Geen Screen" CIS:

• Our CIS was an -in-house," text-based program with no geographical reference, and resided solely on the AS400 operating system.

#### WHERE do we go from here?

- In reality, the information the map books provided, could never actually be considered <u>-eurrent</u>."
- We needed to look for an alternative method of providing our employees or -users" with the most current, accurate and easily accessible data possible.
- The answer was obvious!









#### Shared GIS data:

- In 1997 Boone Electric, the County of Boone and the City of Columbia, formed a GIS Consortium.
- The Consortium was formed with the intent of sharing GIS data among the three entities.
- Each entity is responsible for updates to their own facilities and unique -layers," while the County of Boone keeps the -landbase" up-to-date and stored on a shared consortium server.

#### GIS to the rescue:

- GIS allows us to have a visual, geographically referenced representation of all our <u>-facilities</u>" and customers along with the same CIS information stored on our AS400.
- Using aerial photography as a backdrop or -layer" our system data can be overlaid to give our users a -real-world" perspective.
- Most importantly, the data can be updated DAILY, which gives our users access to the most current and accurate information.
  - We can -search" for Customers, Poles, Transformers or any other -theme" just by keying in information unique to that theme.
  - GIS allows us to determine the direction of feed of a conductor, or to find the nearest —pretective device" associated to that span of conductor, by requesting a <u>trace</u>" of that conductor.
  - All themes are customizable by the 63 users.
  - Color, size, icon etc... can be changed and saved with just a few simple clicks.
  - While the migration from paper maps and -green screen" CIS to GIS on every desk and in every vehicle has been a huge success, the most positive and valuable aspect of the move has been seen with our Outage Management System (OMS).





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• Due to the functionality of our GIS-based OMS, our outage response time is shorter and the ease of locating the outage in the field is much greater and more accurate.

#### Smart meter outage notification:

- At Boone Electric, we utilize the functionality of Smart Meters. These meters are designed to detect power outages and monitor power -quality." When a Smart Meter loses power, it automatically notifies us of an interruption in service.
- When power to a Smart Meter is interrupted an -alert" window is displayed in the GIS. This informs us of the possibility of a larger outage, sometimes prior to receiving a customer phone call.
- Through additional programming and scripting, our GIS has the ability to send us an e-mail, informing us when there is an outage of a pre-determined magnitude. The email gives us the Substation, Feeder, Breaker and number of consumers affected by the outage.

#### **Endless possibilities:**

- GIS provides endless possibilities and opportunities. This is limited only by our imagination and access to data.
- Examples include: Interfacing with AVL, use in ROW maintenance, Fleet Management, and System Planning.
- It is a readily accessible information system that can provide all users with information, both geographically referenced and text based, never previously thought possible.
- What was once the future of mapping, OMS and Facility Management, is now a staple.







**Scott Olsen,** *Boone County Fire Protection District* – Scott described the importance of GIS capabilities for Emergency Response by relating the experiences of the Boone County First Responders in the FEMA Urban Search and Rescue System Response to Hurricanes Katrina (2005) and Ike (2008):

# **Concept of Operations**

- 24-hour operations, variety of staffing options
- Self-sufficient for first 72 hours or more
- Resupply after 72+ hours through Incident Support Team (IST) logistics
- Responses within 6 hours of activation for air travel, 4 hours for over-the-road ground travel
- Multi-faceted/cross-trained personnel
- Standardized equipment, training and procedures
- National Incident Management System (NIMS) compliant

#### Issues

- Little intelligence/data for region available to IST
- Commercial paper maps only
- No standardized large area search procedures
- Marginal GPS capabilities/standardization of data processing
- Map reproduction capabilities
- Limited GIS capability
- Workflow issues
- Geocoding issues
- Reproduction and printing issues

#### Solutions / Lessons Learned

- Define a standard search process/definitions
- Use GPS devices
- Move toward GIS teams
- Utilize the NGA, the USGS and others
- Continue to work on standardized workflow procedures
- Data warehousing/data acquisition is getting better
- We still need to do better





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#### Boone County, Missouri Shared GIS Consortium Geographic Information System Visioning Workshop Report



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**Tom Schauwecker**, *Boone County Assessor* – Tom did an excellent job describing the reasons why his office made the transition to GIS in 1997. Their Appraiser Information Viewer can now provide access to current and accurate data from multiple administrative agencies, which has transformed Tax Mapping and Assessment operations and created the Land Records foundation for the entire consortium.



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**Jason Warzinik**, *GISP*, *Boone County GIS* – Jason concluded the session by describing the County's GIS Web applications. Boone County GIS has developed over two dozen GIS Web applications that are being widely used by Consortium members and the public through <u>www.ShowMeBoone.com</u>.

#### **Assessor's Office**

- Aerial Photo Information Viewer
- Parcel Information Viewer
- Appraiser Information Viewer
- Digital Parcel Map Archive

#### **County Clerk**

- Polling Location Maps
- Voter Information Viewer
- Election Result Viewers

#### Sheriff's Department

- Registered Offender Mapping
- Public Reported Incident Viewer
- Sheriff Information Viewer

#### Planning and Building Inspection

- Road Name Directory
- Zoning Information Viewer
- Master Address Database Search Tools
- PZ Commission Viewer
- Commercial-Industrial Property Inventory Viewer

#### **Public Works**

- Public Works Information Viewer
- Traffic Count Viewer
- Stormwater Problem Reporting Application
- Roadway Problem Reporting Application
- Grader and Mowing Maintenance Tracking

#### Miscellaneous

- Office of Emergency Management Road Closures
- Collector NID Viewer and Tax Entity Viewer
- Human Resources Directions to Buildings
- Commission Regional Sewer Information Viewer







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#### **Boone County Shared GIS Consortium Vision Statement**

At the end of the first day of the workshop a homework assignment was given. Each participant was asked to develop a Vision Statement for the Boone County Shared GIS Consortium.



#### Day Two Recap of Day One

Kim Burns, ESRI Account Manager, conducted a recap of the first day's activities.

#### Small Group Discussion—Vision Statement for the Boone County Shared GIS Consortium.

Participants were asked to suggest a vision statement for the GIS program. Their responses are listed below. During the remainder of the day, they voted on which statement they liked the best, and their votes are indicated in parentheses.

#### **Boone County Shared GIS Consortium Vision Statements:**

Ranking of responses: (total points in parentheses)

*"Provide a comprehensive and integrated GIS that provides all users access to data and applications that can be used to benefit the decision-making process of all users."* (11)

- -Better decisions through information." (2)
- -One people, one goal: improving quality of life for everyone." (1)

- -To develop, implement and offer a universal and user-friendly language that speaks to the seamless integration of intergovernmental applications of GIS; information that captures, stores, analyzes, manages and presents data linked to location." (1)
- -Accessible, accurate information for all."
- -Community information pipeline."
- <u>-Improving public services with geographic</u> information through cooperation, coordination and sharing."
- —The Boone County GIS Consortium provides a unified, collaborative approach to geographical data-sharing efforts that brings efficiency to government services while providing transparency and resources to the public."
- -Collaboratively provide access to information for all users."
- — To develop, utilize and to share better service."
- —Through a shared GIS, provide all users a simple, accurate solution to their data needs."
- -To utilize the consortium to a greater extent when purchasing needed GIS tools to stretch local money and standardize applications and processes through a MOU to cooperate, communicate and share expectations of partners."





# • -Leverage GIS assets to maximize service to our clients."

- — Provide spatial data and tools to the community to aid in strategic and tactical planning."
- —A multi-faceted and diverse technological tool which encompasses vast amounts of knowledge and information that connects communities."

# Presentation—Planning for Success - GIS Futures & GIS Implementation: It's a Journey, not a Destination

This presentation provided an overview of evolving GIS technology that will influence the Boone County Shared GIS Consortium within the next five to ten years. Six emerging technology trends were examined:

- 1. Server-Based GIS
- 2. GIS Application Integration
- 3. Geodatabase Management
- 4. Web GIS
- 5. Mobile GIS
- 6. Spatial Analysis

The presentation included a discussion of how to manage and maximize existing investments while taking advantage of new web-based technology and methodologies. Alternative GIS implementation strategies were discussed. Emphasis was placed on -small win strategies" and incremental system development to set the stage for envisioning how the Boone County GIS can continue to meet the needs of the community during the next decade.





## Small Group Sessions—Application Design

To capitalize on the workshop discussion to this point, the participants were divided into four teams based on their functional responsibilities and knowledge: Public Safety, Land Records, Infrastructure Management, and Administration. Each team was given the task of selecting a critical GIS application that could build on the Boone County GIS database, and then develop a conceptual GIS system design.



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#### Lunch

## **Group Presentations**

Each group was given approximately two hours to develop their designs. They were asked to design a futuristic GIS application that could be built on a majority of existing Boone County GIS data, and could be completed in nine months. Once the designs were completed, each team was asked to make a short presentation about their application design and recommended implementation strategy.

#### <u>Small Win – Administrative Application # 1:</u> -C.O.I.N.: Community Online Information Network"





#### **Objectives:**

- Improve and enhance communication between Neighborhood Associations (N.A.) and the City.
- Train all citizens on use of the system (to include portal for reporting of issues).
- Collect information at the N.A. level to report and display information on a parcel level basis on:

- Property owner
- Renter/owner
- Animal control
- Weed control
- Violations (health, building code, police, etc.)
- Rental inspections
- Nuisance properties
- Age of structure
- Demographic overlay (race, ethnicity, income, education, etc.)
- Historic structures

#### **Communications:**

- Website so that members can have access to all N.A. residents' addresses physical and e-mail
- Right-Of-Way (R.O.W.)
- Designate public facilities to facilitate neighborhood tree trimming and knowledge of property boundaries
- Stimulate volunteerism to improve buy-in to neighborhood improvements
- Provide current information/updates to citizens impacting the N.A.:
  - State legislation
  - City ordinances
  - Storm water management
  - Amendments, etc.

#### **Databases:**

- Parcel
- Ownership
- Code enforcement
- Rental inspections
- Socio-demographic
- Public facilities (parks, R.O.W., etc.)
- Historic properties
- School district area
- Fire district area
- Voting precincts



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- Police beats
- Bus routes

#### System Outputs:

- Map (website) of N.A.
- Ability to zoom in or out and display information on each property
- Assessed valuation of property
- Access to e-mail for citizens
- Print mailing labels to each N.A.
- Self-reporting of neighborhood issues
- Potholes, streetlights
- City to provide updates to each neighborhood association on maintenance activities and other activities impacting the N.A.
- Overlay (street work)
- Snow removal
- Street closures
- Link to Capital Improvement Program (C.I.P.) projects (1, 3, 5, 10 yr.)

# **Application Benefits:**

• Empowering citizens to engage contribute and participate in establishing a community information and reporting system aimed at benefiting the overall good of the N.A., its residents, the City, and the region as a whole.

# **Short-Term Priorities:**

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- Base map with parcel/properties
- Display by neighborhood association
- Train citizens, engage N.A.'s
- Establish buy-in and input from N.A.'s
- What do residents want the system to do?



#### **Long-Term Priorities:**

- Regionalization (Consortium expansion)
- Ashland, Centralia

# Small Win – Infrastructure Management Application # 2:

-CAPCORD "1" [Capital Improvement Project Coordination]

**Description:** Coordination of capital improvement projects planning and decisions for the benefit of the community as a whole.



# **Objective:**

- Enhance customer service
- Increase communication and collaboration
- Assist needs assessment and targeting
- Increase accessibility to information for all
- Support resource allocation

#### Databases:

- Zoning
- Roads
- Utilities
- Traffic
- Transit
- School
- Parcel
- Land Use

# System Outputs:

- Map that intuitively highlights needs to assist decision making process
- Reports that represent community values

## **Application Benefits:**

- Coordinating infrastructure investment with land use planning
- Allocate resources on a regional basis

#### **Short-Term Priorities:**

• Coordination of efforts to identify options and priorities

# **Long-Term Priorities:**

- Share decision making
- Effective use of capital
- Value-driven project identification and prioritization

#### Small Win – Land Records Application # 3: —ABS—Attendance boundaries for schools"

**Purpose:** Help determine attendance areas for CPS's 3rd public high school and re-draft existing high school boundaries





#### Boone County, Missouri Shared GIS Consortium Geographic Information System Visioning Workshop Report



# **Objectives:**

- Communication/collaboration
- Needs assessment/targeting
- Resource allocation
- Databases
- Census
- Socio-economic data
- Housing data
- Residential development data
- CPS student address data
- Transportation corridors
- Existing capacity
- Planned capacity

#### Databases:

- Parcel data
- Patron survey information (later)

## System Outputs:

- Maps 3-4 scenarios
  - Alternative boundaries
  - Characteristics of scenarios
  - Reports

## **Application Benefits:**

- Community planning tool
- Efficient/equitable resource allocation
- Communication/inter-governmental cooperation

#### Priorities—Stakeholder buy-in Short-term:

- Gather and Q/A Q/C data/software
- ID demographic areas of concern
- ID the technical team

# Long-term—Present 3 to 4 scenarios:

First:

- Analyze data
  - Input/display patron feedback

Throughout:

• Create maps and reports

# <u>Small Win – Public Safety Application # 4:</u> <u>-M.A.R.S.: Multi-agency Automated Reporting System"</u>

**Description:** An easy way for citizens to accurately report complaints, issues, and information that is geographically referenced to the appropriate department, increasing efficiency and effectiveness overall.

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#### **Objectives:**

- Quickly route complaints and issues to the appropriate agencies
- Historical tracking of reported issues and complaints based on location
- Increase accuracy of complaint locations
- Reduce the number of duplicate complaints and calls to user agencies
- Increased accountability to citizens by providing timely feedback

#### **Databases:**

- Parcel layer/Assessor
- Aerial imagery
- Roads
- City/County boundaries
- Addresses
- Utilities
- Hydrology
- Complaints/Issues
- Site improvement comments



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# System Outputs:

- Reports
  - Response time
  - Problem resolution
  - Citizen resolution
- Maps
  - Parcels/Roadways
  - Addresses
  - Areas of complaints
- Queries by
  - Department type
  - Complaint type
  - Geographic area
  - Department user
  - Date/Time
- Suggestion report

# **Application Benefits:**

- Customer satisfaction
- Reduction in work orders and duplication
- Efficiency of resources = \$
- Reduction in personnel time responding to phone calls
- Accuracy of complaint reporting

# **Short-Term Priorities:**

- Buy-in from all user agencies
- Design and implementation of the application

# **Long-Term Priorities:**

- Application modification based on public/user agency input
- Add other agencies













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# Nominal Group Exercise on GIS Implementation Priorities

On the basis of the information provided by the application teams, a nominal group exercise was conducted to determine overall GIS implementation priorities for the Boone County Shared GIS Consortium.



# **Nominal Group Questions:**

What are the three most important implementation priorities for the Boone County, Missouri Shared GIS Consortium GIS participants?

**Ranking of responses:** (the total weighted points are in bold and the numbers of first place votes are in parentheses)



- 1. Master addressing with MOU on current update requirements (maintenance)—**30** (10)
- 2. Communication/cooperation-22 (2)
- 3. Establish clear goals, objectives, and commitment, and provide necessary resources—18 (4)



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- 4. Define, maintain and clearly communicate uniform dataset requirements—13 (1)
- 5. Training of policymakers and users—10 (3)
- 6. Rethink organization structure/governance—9 (0)
- 7. Common goals—7 (1)
- 8. Standards for shared data and metadata—4 (0)
- 9. Proper personnel—not just GIS staff—3 (1)
- Explore different types of membership in the consortium—2 (0)
- 11. Ongoing guidance—2 (0)
- 12. Confirm buy-in by all entities and GO-2(0)
- 13. Clear definition of -what" in a way that communicates what it is to those who don't know—2 (0)
- 14. Responsibility and commitment—2 (0)
- 15. MOU among current members—1 (0)
- 16. Coordinated efforts—1 (0)
- 17. Routine meeting/brainstorming of core users—1 (0)
- 18. Empowerment and buy-in—1 (0)
- 19. Customer needs analysis—1 (0)
- 20. Agreed upon timeline for implementation-0
- 21. ID duplication, omissions, and conflicts-0
- 22. Better management structure-0
- 23. Product effectiveness-0
- 24. Coordinate consortium with policy making agenda—0
- 25. Open access—0
- 26. Expanded policy committee to get buy-in—0
- 27. Define policy framework—0







#### Wrap-up Discussion

• A final group discussion was held to evaluate the results of the workshop and to arrive at a consensus for the next set of GIS actions within the community. The discussion focused on steps and activities needed to improve address data maintenance and quality, and to provide a wider range of easy-to-use web and mobile applications. Excellent work has been done by the Boone County Shared GIS Consortium developing the existing GIS capabilities as illustrated by the work done to develop a solid community GIS database; an outstanding E911 Communications Center GIS with Emergency Response capabilities; an inclusive Natural Resource Inventory for the City of Columbia; an innovative Facility Management and Smart Meter GIS for Boone Electric; a comprehensive Tax Mapping and Assessment System; and over a dozen GIS Web Applications in support of <u>www.ShowMeBoone.com</u>.



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While tremendous progress has been made by the Consortium, it was suggested that there is a need to evaluate existing processes and workflows in light of rapidly evolving technology, particularly GIS Server, Web and Mobile technology. The collaboration and use of existing and enhanced geodatabases and application resources from a common GIS Server infrastructure will enable the community to continue to enhance the dozens of operational Web applications from a common base that can be maintained in near real time. Many of the participants also expressed the need for a continuing dialog to share ideas and capabilities.



At the end of the discussion, each workshop participant was asked if the workshop had been helpful in gaining a better understanding of the value of GIS technology in the community. The group collectively agreed that the workshop had been a success and were anxious to begin development of the next phase of enterprise GIS applications for the Boone County Shared GIS Consortium.





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December 3, 2009

Mr. Jason Warzinik, GISP GIS Manager Boone County 801 E. Walnut, Room 123 Columbia, MO 65201-4890 Mr. John Fleck GIS Manager City of Columbia Information Services Department 701 East Broadway Columbia, MO 65201

Dear Mr. Warzinik and Mr. Fleck:

Enclosed is a copy of the report on the GIS Visioning Workshop that was held by The Boone County, Missouri Shared GIS Consortium on October 28<sup>th</sup> and 29<sup>th</sup>, 2009. This report represents our effort to capture and condense the results of the two days of hard work by Consortium participants to help plan the future direction of GIS in Columbia. We were delighted with the excellent participation and the eagerness exhibited by all of the workshop participants in their desire to create an enterprise GIS that services the full community of interests in the Boone County Shared GIS Consortium. Some of the discussion and recommendations made during the workshop indicated a good understanding of the path ahead.

To help you and the other workshop participants develop a series of next actions for GIS implementation, we have developed the following summary recommendations from the workshop report as well as our personal evaluation of your situation. Please keep in mind that this is not a comprehensive review of the situation, but rather a series of observations based on the workshop discussion and our experience with working on successful GIS systems in other communities.

- First, recognition must be given to the excellent GIS work that has already been accomplished as a result of the strong leadership and vision of the elected officials in Columbia and Boone County, and other key local officials within many departments and organizations in the City, County, and Boone Electric. Each of these entities should be commended for their leadership and commitment to the use of GIS technology to increase efficiency, reduce cost, and improve citizen service. Particular recognition should be given to the Boone County / Columbia Joint Communications Center for their implementation of the E911 Communications Center GIS; Boone Electric Cooperative's GIS and smart meter outage notification application; the City of Columbia's Natural Resource Inventory, and Boone County's two dozen web-based GIS applications as part of <u>www.ShowMeBoone.com</u>.
- 2) The County Assessor's Office should also be commended for the important work they have done integrating the county's property parcel maps with their Computer Assisted Mass Appraisal (CAMA) System, thereby creating a comprehensive Land Records database that is now easily accessible through the Appraiser Information Viewer that provides public access to the county's property information. The property database has now become one of the best in the State of Missouri and will continue to serve as an important foundation for future Consortium applications.

- 3) An excellent GIS framework was established by the City, County, and Boone Electric in 1997 through the Boone County Shared GIS Consortium in an effort to create a true enterprise GIS environment. One of the primary recommendations from the group is the need to continue to maintain and strengthen the high level of commitment and communication within the community in the following ways:
  - a) Continue to support Consortium GIS staffing and maintain an on-going commitment to GIS technical training. Without professional and technically knowledgeable GIS staff, the ability to maintain and enhance your GIS capabilities will be very limited. While the number of GIS applications that have already been developed by the Consortium is amazing, your ability to continue to maintain, upgrade and create new applications will be severely restricted without additional staff. Based on recommendations from the workshop it is apparent that there are a couple key areas that need to be focused on with training and staffing, these include web development skills, and database administration, particularly situs address management. Continuing to use your own staff to manage your GIS capabilities with empowered teams is by far the best and most cost-effective way to achieve your goals.
  - b) Continue to maintain executive involvement and commitment in the development and implementation of your GIS capabilities. As demonstrated in the workshop, there is sincere interest and commitment on the part of community leaders in the GIS project. It is essential that you continue to engage key policy and decision-makers in the process through your GIS Policy Committee. The committee should provide direction and resources while delegating system planning and design, technology assessments, creation of database standards, and application recommendations to your Technical Committee. Periodically, the Policy Committee should review and approve all Technical Committee recommendations and provide continuing guidance to the committee. The Consortium GIS Coordinators should serve as a staff to the Policy Committee and be responsible for documenting all Committee decisions.
- 4) While a good spatial database framework has been created for Boone County, workshop participants recognized the need to continue to embrace a variety of emerging new GIS and internet technologies to extend Consortium GIS applications within the community and to create a user-centric GIS enterprise environment.
  - a) Workshop participants recommended that most future applications be "internet-based" to improve access, ease of use, ensure data currency, reduce cost, and to improve system administration. With the availability of server-based GIS technology the Consortium has the opportunity to develop or reengineer a variety of administrative applications with GIS capabilities. Developers should take advantage of web services Services Oriented Architectures to implement a high level of flexibility and reusability in the application development process. See the following examples: (http://www.esri.com/software/arcgis/arcgisserver/live\_user\_sites.html).
  - b) With the wealth of local GIS data and the power of web services to integrate other administrative applications, a variety of Web-based executive dashboards should be developed to support Consortium administrative operations. By geographically displaying real time, or near real time, operational data within the context of a Common Operating Picture, departmental GIS users can develop effective decision support and modeling capabilities to proactively improve operational performance and predict resource

requirements. Boone Electric Cooperative's Smart Meter outage notification application is a good example of these capabilities. A variety of other templates are available at (<u>http://resources.esri.com/gateway/index.cfm</u>) and (<u>http://resources.esri.com/waterutilities/index.cfm</u>?fa=codeGallery).

c) To guide the Boone County Shared GIS Consortium's GIS implementation of an internetbased user centric enterprise GIS environment, we recommend the development of a **5 year GIS Master Plan for the Consortium**. The plan should establish specific goals and objectives; document existing databases and applications; evaluate the accuracy, currency, and maintainability of all systems; define existing hardware and networking capabilities and areas neededing improvement; evaluate technology trends and opportunities for application and database integration; recommend technology standards and a program for work-flow reengineering; and identify and prioritize specific internet applications on the basis of their R-O-I (<u>Return-On-Investment</u>) to the community. It is recommended that the GIS Master Plan be developed internally with the selective use of outside consultants.

The following GIS vision statement was developed and received the majority of the votes during the workshop:

# *"Provide a comprehensive and integrated GIS that provides all users access to data and applications that can be used to benefit the decision-making process of all users."*

This statement clearly represents the Consortium's understanding of the power of geographic information and the need for interdepartmental and interagency cooperation to achieve the goal of an enterprise GIS for the community. As Consortium members move forward with additional geodatabase and GIS application development, it is hoped that the fundamental concepts embodied in the language of the vision statement are employed as ongoing benchmarks against which to measure the success of the GIS enterprise.

One of the real values of an enterprise GIS is the ability to create data and applications once and use them many times. This is particularly important with Web-based applications. While it is important for individual departments to develop and maintain their own GIS applications, it is also essential that a seamless, non-redundant geodatabase repository of core or common GIS database elements be maintained. Without a formal mechanism to identify common database standards and the interdepartmental workflows needed to maintain the accuracy, currency, and integrity of those database standards, much of the potential and promise of GIS will be lost.

As indicated by workshop participants, the number one requirement for the Consortium is that all GIS data be accurate and well-maintained. Through good geodatabase design, and by ensuring that GIS data is digitally linked and continually maintained through normal administrative processes and workflows - like land records management and permitting and infrastructure work management - this requirement can be easily achieved. Particular attention was placed on the importance of improving situs addressing in the city and county. The establishment of an effective **Boone County Address Framework** that recognizes the natural hierarchy of property parcel address assignment is one of the most important data management steps in the development of a successful GIS (see the diagram below). Addresses are the primary location key and reference used by most applications, therefore, it is critical to create and maintain a system of unique addresses with common aliases and place names. This is particularly essential for emergency management applications where quickly responding to the proper address can literally save lives.

Land Parcel Situs Address	G	
Sub-Parcel Identifiers Ow	ners Address	
Structure Addresses	Place Names	
Occupant Addresses	Access Addresses	Place Names
(i.e. apartment, condo, business)	(side street access)	(i.e. city hall, Wal-mart, 1 <sup>st</sup> church)

In addition to the continued development of the Consortium's geodatabase, a web-based Geoportal or card catalogue of metadata for all Consortium geographic features and attribute data needs to be established (www.esri.com/software/arcgis/geoportal/index.html). A Geoportal that is accessible by all GIS users and eventually the public should provide easy web and application access to the most accurate and current data that is available in the community. Please look at the Kentucky Geography Network (www.kygeonet.ky.gov), the Geospatial One-Stop (gos2.geodata.gov/wps/portal/gos) and ArcGIS Online (www.esri.com/software/arcgis/arcgisonline/map\_services.html) as excellent examples of this technology.

From the results of the nominal group activity on GIS application requirements and the small group application design sessions, it is recommended that workshop participants embark on the following major application and core database development activities. An incremental GIS implementation philosophy of creating "small win" GIS applications should be pursued. Applications with revenue enhancement potential should be evaluated for early implementation. Each of these applications, if well designed, implemented, and managed, has the potential to provide a significant R-O-I (<u>Return-On-Investment</u>) for the community.

- Address Management As indicated above the top requirement of all workshop participants is the improvement of address management county-wide. Since address assignment is a responsibility of all jurisdictions within the county, it is important to establish a coordinated workflow between Boone County and local jurisdictions. A detailed analysis should be made of existing workflows so that a successful address management strategy can be developed. You might consider contracting with a consultant to help with this activity: <u>http://www.spatialfocus.com/services.html</u>. Once the strategy has been developed you might also evaluate the use of a third party application product to manage and maintain addresses within a multi-user environment: http://www.farragut.com/products.html.
- 2) Boone County Web Mapping Service Workshop participants also identified the need for the development of consistent local base maps that could be used to support GIS Web-based applications as an important capability. This requirement provides a unique opportunity for Consortium members to develop integrated Web 2.0 capabilities that can support a wide variety of departmental applications. Utilizing Server-based GIS capabilities and one of the new Web development environments (JavaScript, Flex, Silverlight), a reusable GIS Web Application development framework can be created to provide a high quality base map foundation upon which operational applications can be built. By collaborating on a common base map service, the City, County and Boone Electric can maximize the use of local aerial photography, elevation and planimetric data; provide for high quality cartography at various scales; maintain excellent performance with map caching; and ensure that base map information is consistently updated. This will substantially reduce the potential for duplication, cost and error. From this common

base map, additional GIS application services can be added to support Land Records, Infrastructure Management, Emergency Response, Economic Development, etc.

- 3) Mobile GIS Application Framework In conjunction with geodatabase and GIS Web development, the use of Mobile GIS technology for data collection and wireless communication was also identified as a high priority. The ability to collect and locate data and photographs in the field via wireless networks will provide the capability to update your GIS systems in near real time. This also provides the ability to locate and communicate new information and instructions to field personnel over the same wireless network. While critically important for emergency response and public safety, it is becoming equally important for public works, utility, and inspection staff. With the use of Server-based GIS, a Mobile Application Framework can be developed to enhance a variety of City and County workflows.
- 4) Multi-agency Citizen Service System One of the most important application requirements identified by workshop participants is the development of an easy way for citizens to accurately report complaints, issues, and information to appropriate local agencies. By having a one-stop Citizen Service System that supports multiple departments, the system can help support an effective and efficient response to citizen requests by reducing the number of duplicate complaints and redundant calls to user departments and by increasing the accountability to citizens by providing timely feedback. Today there are a number of excellent CRM (Customer Relationship Management) Systems on the market with integrated GIS capabilities that could be used to support this type of application: <u>http://www.esri.com/library/fliers/pdfs/cs-indianapolis.pdf</u>.
- 5) Capital Improvement Project Coordination One of the "small win" opportunities recommended by the Infrastructure small group team was the development of a web application to identify planned maintenance and CIP construction projects, and to improve infrastructure coordination. This application could be an excellent prototype for the development of an Infrastructure Service Common Operating Picture. When integrated with existing infrastructure reporting, management capabilities, and GASB-34 accounting, this application could also serve as the basis for a comprehensive Infrastructure Management and Modeling environment to improve infrastructure management, workflows, and overall coordination.
- 6) Attendance Area Boundary Database The Land Records small group team identified the need to create attendance area boundaries for Columbia Public Schools as an addition to the Consortium's geodatabase. Attendance area boundaries would enhance community planning and would enable the re-design of attendance areas in support Columbia Public School's 3<sup>rd</sup> public high school. It would also provide another important geo-demographic layer for redistricting and resource allocation.
- 7) Online Community Information Network Another significant "small win" opportunity would be the development of a Community Information Network Web application for Neighborhood Associations and the City. By providing a GIS Web resource for basic information and timely communication (bulletin boards, e-mail and blogs) the application would help empower citizens to engage, contribute and participate in community information collection and reporting aimed a benefiting Neighborhood Associations, residents and the City. This type of social network would improve and enhance citizen communication with each other and with local government organizations.

- 8) Social Service GIS Workshop participants also indicated the need to utilize the Consortium's GIS capabilities for social service applications. By confidentially integrating social service and health information with other local GIS data, administrators can analyze hot-spots, evaluate trends and patterns, and predict resource requirements within the community. The use of these decision support capabilities can help elected officials evaluate the success of community based programs by evaluating program goals against actual outcomes.
- 9) Establish a GIS Training Program for Continuing Education A program should be developed to provide authorized training for GIS products and related computer technology. A training program about the availability of federal, state, and local GIS databases should also be created. Special emphasis should be placed on developing a recurring GIS educational plan for local elected officials and decision makers.

Jason and John, we sincerely hope these recommendations help in continuing to enhance the Consortium's enterprise GIS capability. We also hope that the cooperation and communication we witnessed during the workshop will enable all participants to begin steps toward the continued development of a community-wide GIS program with broad participation.

If ESRI can provide any further assistance to you, please let us know. We have really enjoyed being partners in your success to this point, and look forward to working with you in your future endeavors. Thank you for the opportunity.

Sincerely,

Environmental Systems Research Institute, Inc.

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Stephen Kinzy, GISP Regional Manager

Enclosure: GIS Visioning Workshop Report

Kim Burns Account Manager